Midterm#1 Review

Introduction & Cell Injury

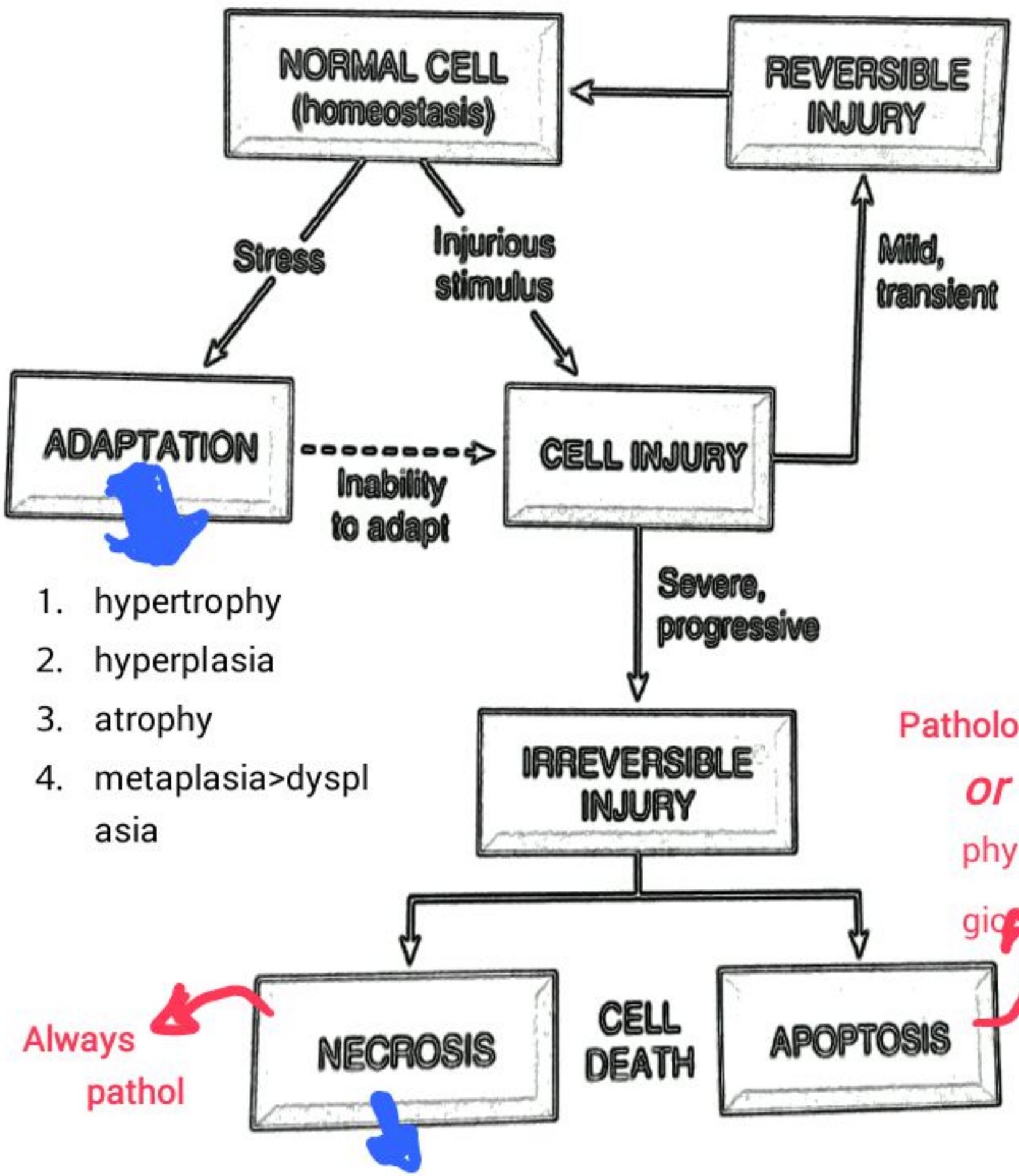
Introduction:

Definitions: Epidemic, Endemic, Mortality, Morbidity, Prevalence, Incidence, (idiopathic/ essential/ primary/ cryptogenic/spontaneous) disease.

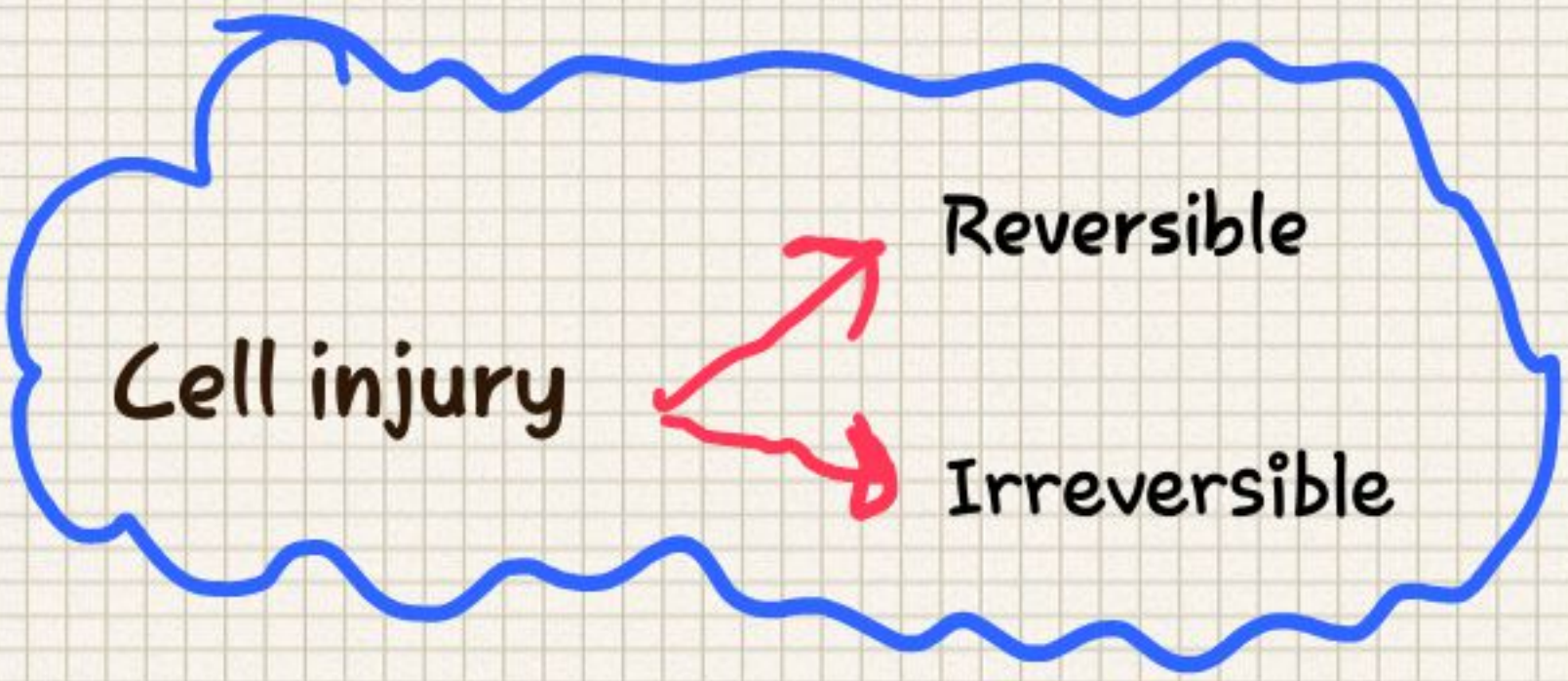
Classification of diseasses:

- **congenital**
  1. genetic
  2. nongenetic
- **acquired**
  1. Inflammatory
  2. vascular
  3. growth disorder
  4. degenerative
  5. drug induced
  6. infective
  7. metabolic

Cell injury:



1. hypertrophy
2. hyperplasia
3. atrophy
4. metaplasia>dysplasia



1) Reversible cell injury

- Disturbance of cell membrane permeability.
- Cellular swelling (Hydropic Change)
- Cell membrane blebs
- loss of ribosomes and microvilli
- fatty change (steatosis)
- Myelin figures

2) Irreversible cell injury

- Mitochondrial Dysfunction
- Profount (severe/harsh) disturbance in membrane function

- Increased cytoplasmic eosinophilia
- Numerous myelin figures
- Swelling and rupture of lysosomes
- Nuclear changes — Karyolysis; Pyknosis > karhorrhexis

Mechanisms of cell injury:

I. ATP depletion

Reduced Oxygen and nutrients supply reduces the pumps activity, less protein synthesis, and decreased intracellular pH.

II. Mitochondrial damage

This releases free radicals and activates apoptosis

III. Influx of Calcium

Activates enzymes that trigger apoptosis.

IV. Accumulation of Free Radicals

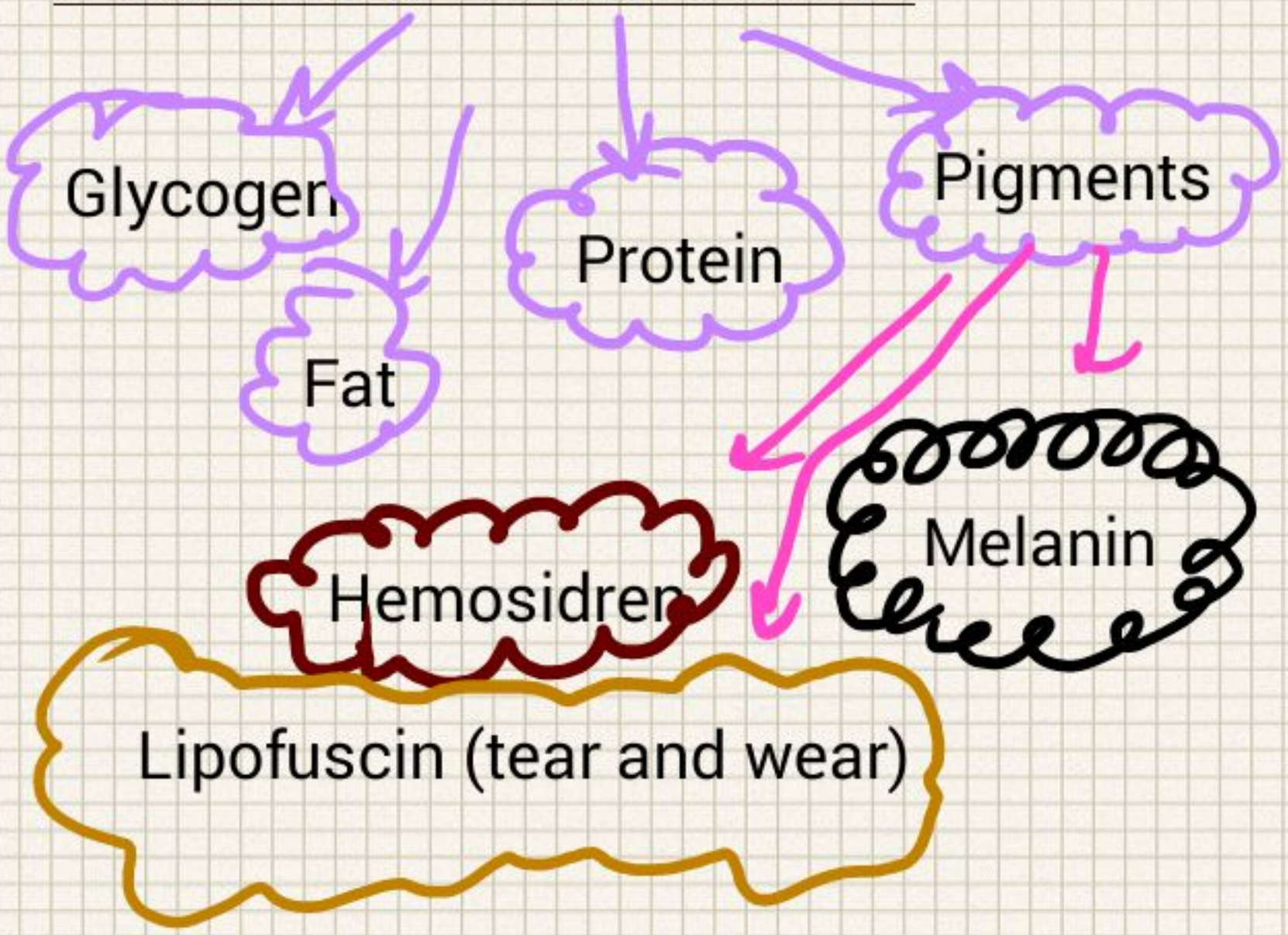
V. Increased permeability of cell membrane

VI. Accumulation of damaged DNA & misfolded proteins

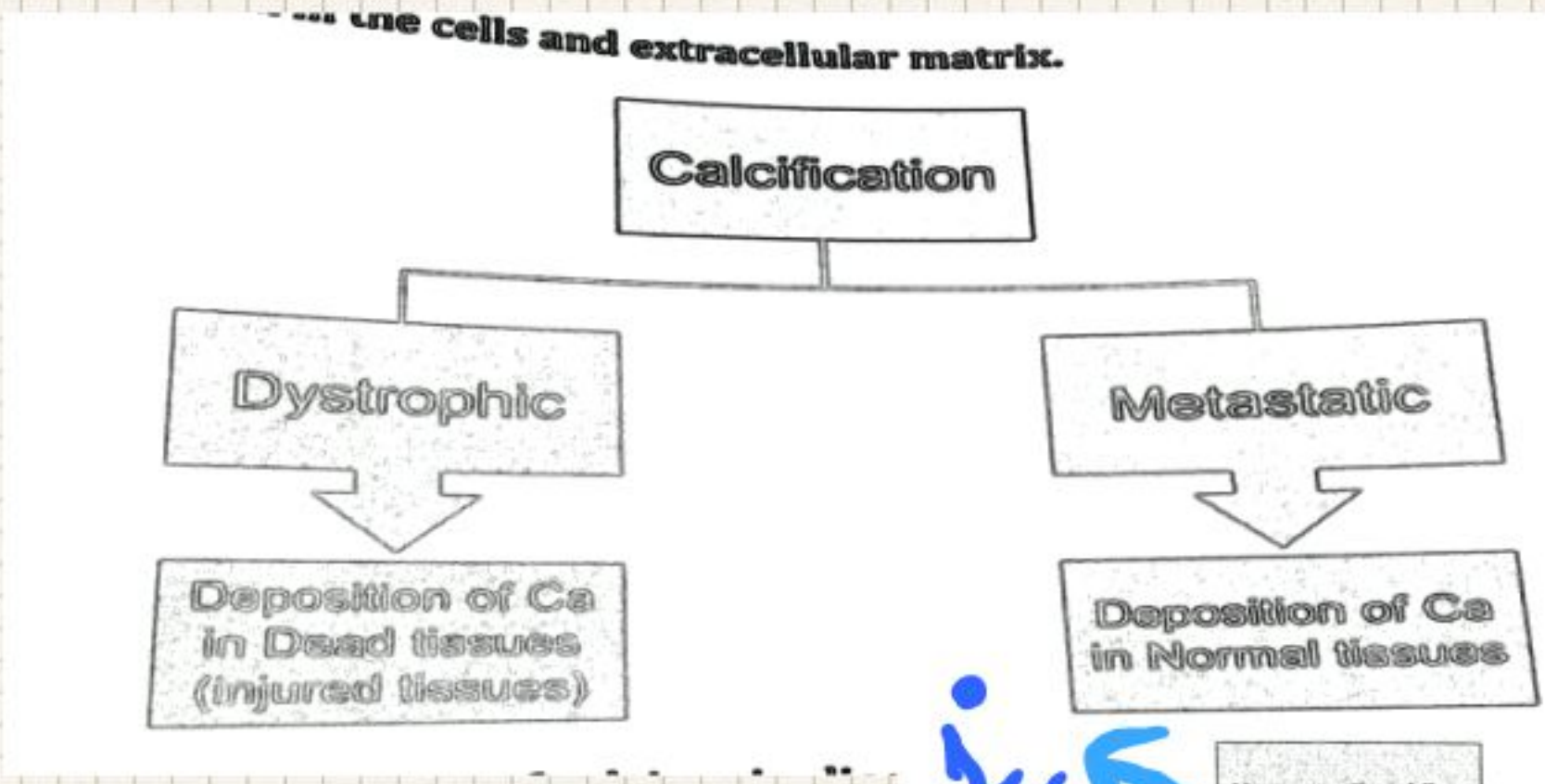
Apoptosis and Necrosis

Feature	Necrosis	Apoptosis
Cell size	Enlarged (swelling, Bigger)	Reduced (shrink, smaller)
Nucleus	nuclear changes: karyolysis, pyknosis, karyorrhexis	Fragmentation (break down) into nucleosome sized fragments.
Plasma membrane	Disrupted (braked)	Intact (held together), with altered structure, especially the orientation [35](الجلد) of lipids.
Cellular contents	Digested by enzymes and may leak out of the cell	Intact [36] and may be released in apoptotic bodies.
Adjacent inflammation	Inflammation is usually present	No inflammation
Physiologic or pathologic role	ALWAYS pathologic.	Physiologic most of the time. It may be pathologic in some times especially if there is DNA damage.

Inracellular Accumulations

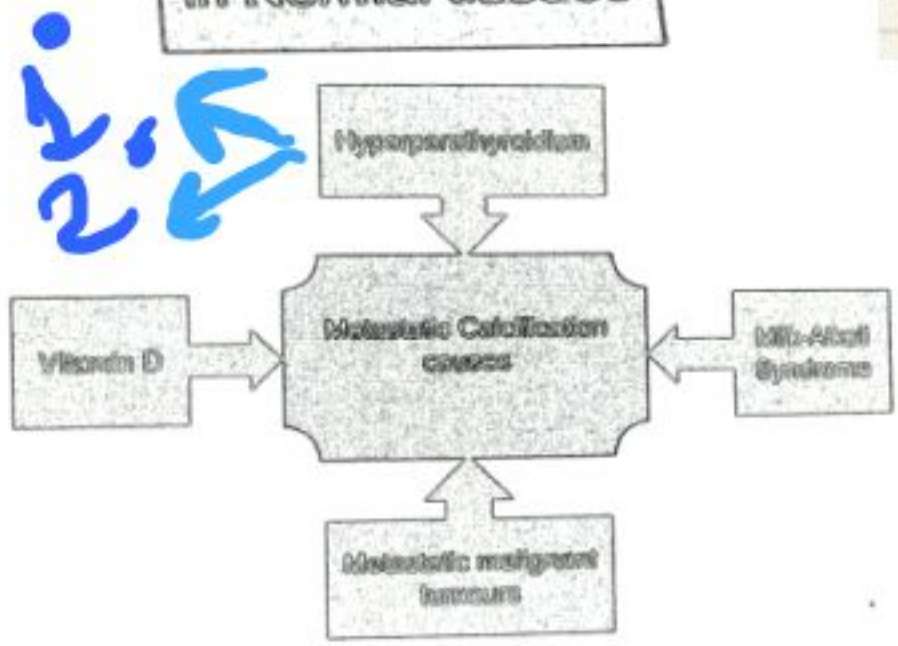


Abnormal Patgological Calcification



Dystrophic: NO hypercalcemia

Metastatic: hypercalcemia



Dystrophic Calcification	Metastatic Calcification
Occurs in necrotic tissue	Occurs in normal tissue
Doesn't cause Hypercalcemia	Causes Hypercalcemia

Review questions:

Q1. While examining a 32 years old man who has abnormal liver function tests, you suspect that he might have hepatitis B viral infection and decide to take a blood sample in order to check for hepatitis B surface antigen status. To which one of the following laboratories you should send the blood sample of this patient?

a. Immunology.
b. Haematology .
c. Microbiology.
d. Biochemistry.

Q2. During the process of making a diagnosis, which one of the following steps is used to confirm the diagnosis or influence the patient management?

a. Documentation of symptoms.
b. Examining the patient for clinical signs.
c. Determine which organ or body system is affected.
d. Performing radiology and laboratory investigations.

Q3. Which one of the following cell injury manifestations is reversible?

a. Apoptosis
b. Cell membrane rupture
c. Hydropic change.
d. Nuclear condensation.

Q4. Which one of the following types of necrosis is caused by bacterial decomposition?

a. Fibrinoid.
b. Wet gangrene.
c. Enzymatic.
d. Caseous.

Q5. A 37-year-old woman who is known to have otitis media (inflammation of the mid-ear) presents with a history of fever and severe headache. A CT Scan of the brain showed a necrotic lesion filled with pus. Which one of the following types of necrosis is expected to be seen in this lesion?

a. Gangrenous.
b. Coagulative.
c. Caseous.
d. Liquefactive.

Q6. A biopsy taken from the uterine cervix of a 29-year-old woman showed atypical squamous cells with premalignant transformation. Which one of the following changes has occurred in this case?

a. Metaplasia.
b. Dysplasia.
c. Hyperplasia.
d. Hypertrophy.

Q7. A piece of tissue which is taken for diagnostic purposes is best called:

a. Cytologic preparation.
b. Smear.
c. Excision specimen.
d. Biopsy.

WISH YOU THE BEST OF LUCK !!

@pathology434

Regards

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